HIGH SCHOOL AND UNIVERSITY
MATRICULATION EXAMINATIONS BOARD.

DEPARTMENTAL EXAMINATIONS, 1929.

ALGEBRA 3.

Time — Three hours.

Values.

7 **1.** Find the sum of the first 30 terms of the $A.\ P.$ whose first term is 29 and whose fourth term is 23. 0.

7 **2.** Obtain a formula for the sum of an infinite geometric series.

7 **3.** Sum to n terms $3 + 33 + 333 + \ldots\ldots\ldots$ $\frac{1}{3}\left\{\frac{10}{9}(10^n-1)-n\right\}$

8 **4.** A traveller's earnings consist of a fixed monthly salary and an additional sum which varies as his monthly sales. In one month in which his sales are \$2000, his earnings are \$200. In another, in which his sales are \$2460, his earnings are \$223. Find his fixed monthly salary and his monthly sales when his earnings for the month are \$250.

\$100
\$3000.

5. Attempt *two* parts only:

7 (a) If a and b are the roots of $px^2 + qx + r = 0$, find the equation whose roots are $\frac{a}{b}$ and $\frac{b}{a}$.

7 (b) Find the square root of $6 + \sqrt{12} - \sqrt{24} - \sqrt{8}$. $1+\sqrt{3}-\sqrt{2}$

7 (c) State and prove the correctness of a rule for writing the ratios of x to y to z when

$$ax + by + cz = 0, \text{ and } a_1x + b_1y + c_1z = 0.$$

7 **6.** Prove that $\frac{1}{1.4} + \frac{1}{4.7} + \frac{1}{7.10} + \ldots$ to n terms $= \frac{n}{3n+1}$

[OVER]

CURRICULUM
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xam.1
URR HIST

Values.

7. Attempt *two* parts only.

8 (*a*) Find the number of combinations of n different things taken r at a time.

8 (*b*) How many arrangements of the letters of the word, *strange,* can be made if the vowels are to appear only in odd places? 1440.

8 (*c*) From a company of 9 men and their wives a party of 4 men and 4 women are to be chosen. In how many ways can this be done so that a man and his wife shall not be in the same party? 630.

8. Attempt *three* parts only.

8 Find the coefficient of x^{10} in the expansion of

$$\left(x - \frac{2}{x}\right)^{20} \qquad -\frac{\lfloor 20}{\lfloor 5 \, \lfloor 15} \cdot 2^5$$

8 (*b*) Show that the coefficient of x^r in the expansion of

$$(1 - 4x)^{-\frac{1}{2}} \text{ is } \frac{\underline{/2r}}{\underline{/r}\;\underline{/r}}.$$

8 (*c*) Three consecutive coefficients in the expansion of $(1 + x)^n$ are 91, 364, and 1001. Find the numerical value of n. 14.

8 (*d*) Find the coefficient of x^{20} in the expansion of

$$\frac{1 + x + x^2}{(1 - x)^3} \qquad 631.$$

10 **9.** What sum must be set aside annually to provide for replacing machinery costing \$20,000 and having a probable life of 20 years and a scrap value of \$1500, if the depreciation fund can be invested at 5%? \$559.45

100